Remarks/Arguments

Paragraph 2. of the office action of 4/2/2010 Claims 1-3 and 13 are rejected under 35 U.S.C. 112 First Paragraph "Claims fail to comply with written description requirements".

I have revised the claims to strictly adhere to the original written description as filed and posted on the USPTO web site, as application 20030159690. Excerpts of which were used to revise the claims.

> [0018] ....."**At night, when the fluid in the *solar heat transfer system* cools and contracts, fluid is drawn back into the heat transfer system to keep if full of fluid and keep air out".....**
>
> [0021] ....."**In this event the boiling gas separator (28) allows the gas bubbles to go into the liquid to air heat exchanger (29), which stirs the liquid in the heat exchanger, while condensing the boiling gas and heats it above outside air temperature and dissipates this heat to the outside air".....**

Paragraph 4. of the office action of 4/2/2010 rejected Claims 1 as being anticipated by Moore (3,661,202).

Figure 16 and 18 show ejector pumps and one way pressure relief valves that vent vapor to a low pressure reheat space, where it can pick up more heat, but this vapor is not allowed to leave the closed container as you can see by carefully reviewing the figures. Even though the container has a provision for variable volume (Figure 2), there is no claim or description of an unpressurized fluid reservoir open to atmosphere.

The examiner implies that Moore's system has an unpressurized reservoir. This can not be the case given Moore's Claim 1, Lines 34-37, "a partly condensed fluid, a portion of said fluid being liquid and another portion being vapor, said liquid".
If there is only liquid and vapor of this liquid in the system, then the ideal gas law must hold. According to the gas laws PV=nRT. P= pressure of gas, V=volume of chamber and nR are gas constants and T = Temperature. Hence, if volume in the chamber is not constant and temperature increases so must the pressure and volume. Moore shows a bladder expansion system in Figure 2 which allows the volume in the system to be increased to keep pressure rises smaller, but he does not claim any unpressurized fluid reservoir.

I claim an unpressurized reservoir, which is open to the atmosphere.

I agree with the examiner that "The fluid thermal expansion and contraction is anticipated by Moore", since he has both liquid and vapor of the same liquid in his system, with a large vapor expansion chamber and container volume increase (Figure 2) to keep pressures from rising too much. The thermal expansion of the fluid merely decreases the volume of the gas and raises its pressure slightly and increases the container volume slightly.

Moore still does not have an unpressurized reservoir with pressure relief and overflow recovery. I recite a system that is full of fluid. When the fluid thermally expands more than the tubes it is contained in, the system pressure can reach several hundred PSI, and fluid is allowed to leave the system through a pressure relief valve. If the fluid reaches the boiling point and gas bubbles appear in the liquid, the volume created by the gas bubble must be formed by letting liquid out of the system via the pressure relief valve. When the gas bubbles collapse, liquid must be drawn back into the system to fill this void space.

Paragraph 5. of the office action of 4/2/2010 "Claims 2, 3, and 13 as being anticipated by Hardy (4,360,003)".

Hardy's Claim I, Lines 7-14 " vacuum breaker means coupled to said inlet for said tubing preventing siphoning of tank water into the domestic water system, float valve controlled outlet means coupled to said tubing within the water tank to fill the tank to a predetermined level and relief valve means coupled to said tubing providing relief in the event of excessive water temperature and pressure in said tubing."

Hardy claims a single city pressurized system which has a pressure relief valve, a float valve to fill a reservoir and a vacuum breaker valve. I have pointed out previously that a vacuum breaker valve is not a vacuum recovery valve. A vacuum breaker valve must have fluid on one side and air on the other. A vacuum recovery valve has fluid on one side and fluid on the other. They are not the same valve and do not function the same way, even though they may have similar sounding names. **Hardy's vacuum breaker valve is not connected to his fluid reservoir. There is not and must not be a connection between Hardy's vacuum breaker valve and his fluid reservoir.**

Hardy does not anticipate the use of a vacuum recovery valve to take water from his reservoir to his potable water. He can not do this because the water in his reservoir is contaminated and must not be siphoned into the potable water system as stated in Claim 1 above.

I use the vacuum recovery valve to bring fluid from my overflow reservoir back into the system, Hardy does not.

Paragraph 6.a of the office action of 4/2/2010 "There is no mention in Moore of being "Hermetically Sealed".
Moore's Claim 1 Lines 34-37, "a partly condensed fluid, a portion of said fluid being liquid and another portion being vapor, said liquid". This claim specifically limits the gas to be a vapor of said liquid. This means that other gases which are not vapors of said liquid must not be present. If gases like oxygen and nitrogen (Air) which are not condensable at the operating temperature of the heat pipe, they displace vapor of said liquid and violate his claim and degrade the heat transfer by their inactive volume.

Moore's Background paragraph 23-28
"In a heat pipe as a closed chamber charged with a material that coexists in vapor and liquid phases at the operation temperatures of the heat pipe. Other gases are generally excluded".
He recites a "closed chamber" system where vapor can not leave and "other gases are excluded". Claim 1 states clearly that the system consists of liquid and vapor of the same condensed liquid.

Column 28 Paragraphs 6 Lines 48 to 54 In Moore's Claim 19 "Closed Loop Heat Transfer Apparatus" he reiterates the condition of the closed liquid and vapor system of his invention. "19. Closed loop heat transfer apparatus comprising : A vaporizer of capillary material, having a first surface portion in thermal contact with a heat source, a second surface portion, and a third surface portion a partly condensed fluid, a portion of said fluid being liquid and another portion being vapor, said liquid wetting said vaporizer capillary materials;..."

My system includes liquid and vapor. Vapor and liquid can exit the container, only liquid is allowed back in when the vapor condenses back to liquid. In my system vapor is generated in the solar collector and moves to the vapor-to-air radiator to be condensed. When the collector and vapor-to-air radiator cools off, vapor is completely condensed in both, causing fluid to be drawn back into the system.

Moore does not anticipate or claim my heat transfer loop.

Paragraph 6.b of the office action of 4/2/2010 "Claims 2, 3, and 13 as being anticipated by Hardy (4,360,003)".

Hardy's Claim I, Lines 7-14 " vacuum breaker means coupled to said inlet for said tubing preventing siphoning of tank water into the domestic water system, float valve controlled outlet means coupled to said tubing within the water tank to fill the tank to a

predetermined level and relief valve means coupled to said tubing providing relief in the event of excessive water temperature and pressure in said tubing."

Hardy claims a single city pressurized system which has a pressure relief valve, a float valve to fill a reservoir and a vacuum breaker valve. I have pointed out previously that a vacuum breaker valve is not a vacuum recovery valve. A vacuum breaker valve must have fluid on one side and air on the other. A vacuum recovery valve has fluid on one side and fluid on the other. They are not the same valve and do not function the same way, even though they may have similar sounding names. Hardy's vacuum breaker valve is not connected to his fluid reservoir.

Hardee does not anticipate the use of a vacuum recovery valve to take water from his reservoir to his potable water. He can not do this because the water in his reservoir is contaminated and must not be siphoned into the potable water system as stated in Claim 1 above.

Hardy claims an overflow pipe, and even though it sounds like an overflow recovery reservoir which I claim, the two are not the same. My overflow recovery reservoir is designed to hold liquid released from the heat transfer loop by thermal expansion of the fluid and any condensed steam. The fluid from the reservoir is reintroduced to the heat transfer loop via the vacuum recovery valve when the heat transfer loop cools off at night. Hardy's overflow pipe connects above the water-line of his reservoir and is used to send excess water down the drain. Hardy's overflow pipe does not connect to a reservoir below the water-line. He does not claim my invention.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully Submitted,

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